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ABSTRACT

The R. J. Reynolds Tobacco Company is planning to introduce a so-called "smokeless cigarette". This product called Premier is an aluminum cylinder filled with porous alumina beads, corked with charcoal. The company has strongly hinted that the cigarette will provide the user with a dose of nicotine adequate to sustain nicotine dependence while lowering the risks of lung cancer, household fire, and annoyance to nonsmokers. None of these claims has been validated by thorough, independent review. Available data strongly suggest that this nicotine inhaler, if marketed, will be attractive to novices, highly addictive, and toxic in significant ways. It is expected that this product will make achieving abstinence more difficult and will also encourage relapse to nicotine addiction. In a narrow, legal sense, the struggle over whether Premier will be subject to Food and Drug Administration (FDA) regulation lies in a matter of definition, whether or not the product is a cigarette. The intended pleasure effect is clearly a drug effect, the result of the pharmacologic effects of nicotine on the central nervous system. The FDA might assert jurisdiction over products such as Premier which are markedly different from traditional tobacco products while seeking specific legislative authority to permit it to appropriately regulate traditional tobacco products in a manner which does not create tobacco prohibition. (ABL)

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Panacea or New Public Health Menace?

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Abstract

The R. J. Reynolds Tobacco Company has strongly hinted that its so-called "smokeless cigarette" will provide the user with a dose of nicotine adequate to sustain nicotine dependence while lowering the risks of lung cancer, household fire and annoyance to nonsmokers. None of these claims has been validated by thorough, independent review. Available data strongly suggest that this nicotine inhaler, if marketed, will be attractive to novices, highly addictive, and toxic in significant ways. It is expected that this product will make achieving abstinence more difficult and also encourage relapse to nicotine addiction. Prospects for regulation of this product will be discussed.

Introduction

On September 14, 1987, Edward A. Horrigan, the Chairman and Chief Executive Officer of the R. J. Reynolds Tobacco Company, announced at a press conference that Reynolds was developing what the company called "a new cigarette" (1). Mr. Horrigan said, "Since the tobacco does not burn, a majority of the compounds produced by burning tobacco are eliminated or greatly reduced, including most compounds that are often associated with the smoking and health controversy."

A company press release (1) noted,

> It looks, lights and smokes like other cigarettes, but produces no ash and virtually no sidestream smoke after the first few puffs. The smoke exhaled by the smoker dissipates rapidly. In addition, the cigarette, when lying flat, is unlikely to ignite most materials.

Seven months later, both the American Medical Association and the Coalition on Smoking OR Health filed citizen petitions with the Food and Drug Administration asking FDA to regulate this product as a drug (2,3). While FDA has conducted an extensive investigation into this product, including consultations with interested parties, it has not yet issued a response to the petitions.

On August 30, The New York Times and The Wall Street Journal reported that Reynolds was planning to begin test marketing of the new product, called Premier, by early October in St. Louis, Phoenix, and Tuscon. Virtually coincident with the announcement of test marketing plans, Reynolds filed a brief with FDA in response to the two citizen petitions and began distribution of a privately published, anonymously-written book which describes the new product and much of the toxicologic research conducted for the company on prototypes (4,5).

At first glance, Premier seems to be a genuinely "less hazardous cigarette," a conclusion which Reynolds has been at great pains to point out while simultaneously vigorously denying that the company itself believes that its invention is safer than its other products. Despite the supposed "safety" of Premier, many medical and public health groups have raised strong objections to its introduction. Indeed, if FDA did assert jurisdiction over Premier, the result would almost certainly be that this novel product would not be marketed in the U. S.: it is unlikely that Reynolds would ever file a New Drug Application for this product.

In this paper, I will explore the apparent paradox, why health authorities are fighting to prevent a supposedly "safer cigarette" from being marketed.

Description of Premier

The essential element of Premier is an aluminum cylinder filled with porous alumina beads. The cylinder is vented at the proximal end and corked distally by a piece of charcoal which contains 13 tiny holes. A mixture of tobacco extract, an unnamed flavoring, glycerol, and propylene glycol is adsorbed to the beads. The charcoal fuel element is insulated with a fiberglass mat which helps direct heat to the aluminum. About 130 mg of cut tobacco surrounds the aluminum cylinder, and this subassembly is wrapped in paper. The mouthpiece half of the device is in two sections: a rolled paper made in part from tobacco leaves and stems (so-called "reconstituted tobacco") and a piece of spun polypropylene. The mouthpiece subassembly is fastened to the cylinder subassembly with an overwrap called a tipping paper.

The user lights the charcoal and inhales in the manner of smoking a conventional cigarette. Package directions instruct the user to use a particular brand of butane lighter (one which does not employ a flint) instead of matches. The instructions also indicate that an automobile-type cigarette lighter will not work. Customers are warned against using a damaged or bent unit. Heat and drawn air create an aerosol consisting of water, glycerol, propylene glycol, nicotine, both oxides of carbon, and a smaller amount of other materials. Nicotine and carbon monoxide deliveries are similar to those from conventional

cigarettes. Reynolds has indicated that about 70% of the delivered nicotine comes from the tobacco extract adsorbed to the alumina beads.

Manufacturer's Claims and Advertising Theme

Reynolds claims that Premier is intended only to give the user "tobacco taste and satisfaction" (1). Reynolds describes its design goals for the product as follows (5):

> To provide the tobacco taste and smoking pleasure of other cigarettes, as demanded by smokers, and to the degree possible:
>
> a) Simplify the mainstream and sidestream smoke chemistry by eliminating or reducing compounds produced by burning tobacco.
>
> b) Minimize the potential for biological activity, as measured by toxicological assays and tests frequently used to study cigarettes and cigarette smoke.
>
> c) Minimize environmental tobacco smoke and its potential annoyance.

The main theme evident in advertising which has appeared in the test marketing is that Premier is a revolutionary product, a "cleaner smoke" (6).

Comments on "Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco"

The Reynolds book was not subject to conventional scientific peer review prior to publication. Two groups assembled by Reynolds itself have attested to the validity of the methodology used by the researchers (and nothing more), but in a peculiar reversal of the usual approach in scientific publication, the names of these hand-picked reviewers (and their signatures) appear in the book while the actual authors and editors are not identified in any way.

Although the Reynolds book barely mentions the word "cancer," one major conclusion many readers may easily draw from the book is that, based on the behavior of prototypes, Premier is far less likely than a conventional cigarette to cause cancer. This conclusion emerges from various studies on mutagenicity, genotoxicity and exposure of experimental animals to cigarette smoke and an aerosol from Premier prototypes for up to 90 days. No chronic exposure experiments are described, however.

Another major conclusion is that Premier is at least as good as a conventional cigarette at delivering nicotine and carbon monoxide to the user. There are some indications that it performs these functions even more efficiently.

More than a scientific report, the book appears to be a key part of the marketing plan for Premier. It is more expensively produced and written in a more accessible style than most scientific writing. Numerous important issues are ignored. Euphemisms and neologisms mask inconvenient details. The product under evaluation is repeatedly referred to as "the NEW CIGARETTE," (all caps) rather than, for instance, "the new device." A classic marketing trick is simple repetition. The repetition in this instance makes it ever easier for the reader to accept that the new product is, as Reynolds contends, a cigarette.

The phrase "biological activity" is used repeatedly to describe certain supposedly undesirable but unspecified characteristics of cigarette smoke. In context, the term appears to be a synonym for certain specific forms of toxicity, namely those associated with screening tests for carcinogenicity and histologic damage. Clearly not included in Reynolds' use of the term "biologic activity" are the pharmacologic activity regularly and predictably produced by ingested nicotine upon the central nervous system and the toxicity of nicotine and carbon monoxide.

In conventional usage, "tar" is defined as the total particulate matter in smoke minus water and nicotine content. Although Premier obviously produces an effluent which meets this definition, Reynolds calls this material "nicotine-free, dry particulate matter." While the company has gone to great pains to try to show how this revolutionary product fits a definition of

"cigarette," it refuses to apply the conventional definition of "tar," even to the extent of omitting a "tar" rating from its advertising (6), in violation of its voluntary agreement with the Federal Trade Commission on tar and nicotine content disclosures (7). Reynolds also avoids calling Premier a "smokeless cigarette," contending that its aerosol is, indeed, smoke, albeit smoke without soot.

Reynolds refers to the tobacco extract adsorbed to the alumina beads as "spray-dried tobacco." As far as I can tell, this is a new term for tobacco extract. This neologism is the basis for Reynolds' claim that all the nicotine delivered to the user is derived from tobacco in the product. Were Premier a food, the FDA would likely require that the so-called "spray-dried tobacco" ingredient be listed as "tobacco extract."

The book goes to great lengths to describe the lack of known toxicity of ingested glass fibers and alumina beads of the sort contained in Premier, even though it is difficult to imagine how one might inhale these elements. The book also contains literature reviews covering the toxicology of all components of the product but one. It is silent about the toxicology of tobacco and its derivatives. Were Reynolds to apply the same standard to tobacco that it does to alumina beads, the product would be tobacco free.

[redacted] In animal studies described in the book, the aerosol from Premier prototypes was so easy to inhale, that the animals developed serious toxicity from the carbon monoxide.

The implications of Premier for cigarette-caused diseases other than cancer, including addiction, cardiovascular disease, and adverse pregnancy outcomes, are not discussed, even indirectly.

Finally, while the motivation to develop this product supposedly arose from consumer demand for lower tar delivery, no supporting evidence for this demand is ever provided. The major choice facing those who smoke actually is whether or not to try to stop smoking altogether: most who smoke would like to stop (8). It would seem that Reynolds has corrupted this "consumer demand" for abstinence into a hope for an apparently safe nicotine delivery device. In doing so, it is acting in the tradition followed by the industry since the early 1950s.

Historical Context

In response to mounting evidence that cigarettes caused lung cancer, the cigarette manufacturers began to market filtered cigarettes as a supposedly healthy alternative to unfiltered smokes. Although the advertising claims and hints about health

protection were scientifically specious, between 1952 and 1960, the market share enjoyed by filter cigarettes grew from 1.3% to 51%, and filters now comprise 95% of the American market (Figure 1, Ref. 9, 10). More importantly, the decline in per capita cigarette consumption evident briefly in the early 1950s was reversed, and the market actually resumed its steady growth for another decade (11).

Beginning in the late 1960s, the cigarette manufacturers began to emphasize reduced tar and nicotine deliveries in some of their products (9). However, the impact of the "low tar" segment on the American market has not been as profound as the filter switch had been: It was not until 1981 that cigarettes delivering less than 15 mg of tar commanded more than half of the market, and today, these brands only account for a bare majority of the market. (Figure 1)

In both instances, the tobacco industry has maintained that these new products were introduced in response to "consumer demand." Actually, both product variations probably served mainly to make abstinence seem less necessary and, hence, less attractive than switching to a filter or a "low tar" product.

Outside of the tobacco industry, there has been interest over the years in whether cigarettes could be made safe (12, 13). The precise goal has been clouded since the 1950s because of evidence accumulated over the last generation indicating that there is likely no safe way to consume tobacco. The goal has

been articulated in recent years as the seeking of a "safer cigarette" or one which is "less hazardous." A research program at the National Cancer Institute in the 1970s was dedicated to this goal but has been abandoned. However, a safer-cigarette project continues to be funded by the U. S. Department of Agriculture to this day.

The literature on "safer cigarettes" myopically focuses only on the toxicologic properties of the product itself, while ignoring the actual epidemiologic context in which such a product might be used. Furthermore, this literature has paid little attention to the public health and clinical implications of the fact that nicotine produces a drug addiction in a large proportion of chronic users.

A number of products containing nicotine have come under FDA regulatory authority in recent years. Nicorette (R), nicotine polacrilex is regulated as a drug for the intended purpose of helping people recover from nicotine dependence (14). Favor, a nicotine inhaler, was marketed as an alternative to cigarettes when it was inconvenient to light up. FDA ruled Favor a drug in early 1987 on the basis that the manufacturer had indicated intent to maintain nicotine dependence in its users (15). Masterpiece Tobacs, a 1 mg nicotine chewing gum, was classified as a food (16). Distribution was banned because the product was adulterated with tobacco, which is not an approved food additive and

the manufacturer had not demonstrated that it was safe. The nicotine in both Nicorette and Favor is derived from a tobacco extract.

Epidemiological Context

The cigarette market is dynamic. Every day, about 1000 customers die in the United States because of an illness caused by cigarettes, and another 4000 customers quit smoking. Just to stay even, then, the cigarette companies need 5000 new smokers each day. Nearly all new smokers are recruited from among children and adolescents (17).

While it is impossible to say with certainty how the absence of filtered cigarettes or "low tar" products would have influenced the cigarette market in the 1950s or the 1970s, it is likely that cigarette consumption would have declined more than was actually observed were the only choice available to the public whether to smoke unfiltered cigarettes or to quit smoking altogether.

Based simply on a consideration of age, more than half of those now smoking were not doing so in 1964, when the first Surgeon General's Report on Smoking and Health was published (Table, Ref. 8, 18-20).

Public Health Concerns

A number of concerns have been raised about Premier and its possible effects on the prospects for achieving control of the huge, massively destructive nicotine epidemic. These include the possibility that this product is the most addictive form of nicotine ever developed, the fact that the product will be toxic in significant ways, and the likely appeal the product will have for children, smokers who are considering abstinence, and former smokers.

Rats exposed to the aerosol of prototypes achieved very high plasma nicotine levels compared to rats exposed to conventional cigarette smoke at the same levels of atmospheric nicotine (Figure 2, Ref. 21). This seems have resulted from the fact that, unlike cigarette smoke, the aerosol delivered by Premier is not irritating (22). The nicotine is readily available by inhalation and a novice can inhale without difficulty from the very beginning of experimentation. These characteristics probably enhance the addictive potential of Premier above what had been, up to now, the most addictive form of nicotine available, the American blend cigarette.

The aerosol contains substantial quantitites of nicotine and carbon monoxide. These are the substances which are felt responsible for cardiovascular disease and adverse pregnancy outcomes from cigarette smoking. Cardiovascular disease makes a more substantial contribution to morbidity and mortality caused by

cigarettes than does lung cancer. Any possible benefit from a reduced risk of lung cancer in a smoker who switches to Premier will not be realized for many years because of the long latency of lung cancer. On the other hand, the cardiovascular benefit of quitting altogether is rapidly achieved.

Premier is high tech. It does not produce a characteristic cigarette odor which will probably make surreptitious use easy to conceal, and it is easy to draw the aerosol deeply into the lungs. These characteristics will appeal to kids. In St. Louis, Premier is being sold at a 15 cent premium over traditional cigarettes. While kids are price-sensitive in their purchase decisions for tobacco products (23), $1.50 is not out of the range readily available to the young for a pack of smokes having especially attractive qualities.

Those who are considering quitting (up to three-fourths of all smokers) will be challenged by Premier. The decision to stop using a substance to which one is addicted is always clouded with ambivalence (24). The more fuzzy and cloudy the issues appear to the addicted individual, the easier it is to rationalize some form of continued use. Clearly, Premier is an addicting product which will amplify this ambivalence. It sends the message of safety while actually delivering on it in a very limited manner.

Finally, those who have stopped smoking often continue to feel ambivalent towards nicotine. Relapse is common, and Premier may promote relapse at an accelerated pace.

All three of these sources of customers for Premier, the young, current smokers, and former smokers, are envisioned in market analyses of the new product, such as that produced by Roy Burry for Kidder, Peabody (25). Mr. Burry predicts that if products like Premier find consumer acceptance, within 15 to 20 years they could well command 90% of the market now held by cigarettes, and the rate of nicotine dependence might once again increase in this country.

Prospects for Regulation

In an narrow, legal sense, the struggle over whether this product will be subject to FDA regulation lies in a matter of definition. Reynolds calls Premier a cigarette, while its critics contend that Premier is a revolutionary product which cleverly resembles a cigarette. The legal reason this is important to Reynolds is that Reynolds contends that all allowable Federal and State health regulation of cigarettes is contained in the Federal cigarette labeling law.

Whether or not it is a cigarette, the central issue for FDA is whether Premier is a drug, and this, in turn, depends on the intended use of the product.

Reynolds has indicated that it only intends that Premier provide its customers with flavor and pleasure. It claims that Premier is not safer than traditional tobacco products, although

Reynolds seems to expect that many will think it is safer. (Reynolds does not admit that any of its products cause harm, and it has avoided discussing the question of addiction in describing the actions of Premier.)

As an expert in the manufacture of tobacco products, Reynolds might be considered knowledgable about harm from smoking and about the substantial risk of addiction which smokers face. (It is an anomaly that, despite its position of expertise, Reynolds insists that tobacco is not harmful.) It is now clear to the scientific community that the pleasure which people derive from smoking is largely due to the pharmacologic effects of nicotine on the central nervous system. Since this must in large part be what the manufacturer means in describing "pleasure," the intended pleasure is clearly a drug effect.

This analysis obviously applies to traditional tobaco products as well as to Premier. Were FDA to assert jurisdiction over all tobacco products because of the manufacturer's intent to provide pleasure through the CNS actions of nicotine, it might be forced to impose prohibition of all tobacco products. This is not sound public policy.

While new legislation is needed to define an appropriate role for FDA regarding traditional tobacco products, I believe that Premier can easily be distinguished from traditional products by the source of its nicotine and the manner in which the aerosol is generated. The manufacturer's intent to provide

pleasure rests mainly on the ability of the product to deliver nicotine to the brain. Premier would seem to succeed admirably in this respect.

FDA might assert jurisdiction over products such as Premier which are markedly different from traditional tobacco products while seeking specific legislative authority to permit it to appropriately regulate traditional tobacco products in a manner which does not create tobacco prohibition.

International Implications

Whatever the outcome of the regulatory battle over Premier in the U. S., it is clear that Reynolds hopes to market this product around the world. It has applied for patent protection in 110 countries other than the U. S. How this will unfold is not yet clear. Countries with advanced awareness of the harm of smoking, such as Japan, Australia, and the countries of western Europe, are the most likely second round targets for Premier.

Conclusion

Premier is the prototype of a new sort of high tech nicotine delivery system in which heat is generated separately from the material which contains the nicotine. These devices have the potential for radically altering the market for inhalable nicotine products both in this country and abroad.

If successfully marketed, Premier and similar products will eventually alter the pattern of morbidity and mortality from inhalable nicotine products, but overall mortality will not necessarily lessen because the population at risk may actually increase, and these products may be more toxic to the cardiovascular system than traditional tobacco products. Sadly, if these products are a commercial success, the duration of the tobacco epidemic will be needlessly prolonged and the achievement of control made unnecessarily more complex.

References

1. "R. J. Reynolds Tobacco Co. Developing New Cigarette." Winston-Salem, NC, R. J. Reynolds Tobacco Co. Press Release and Product Fact Sheet, issued in New York, 9/14/87.

2. Sammons JH. Citizen Petition of the American Medical Association. American Medical Association, FDA Docket 88P-0155/CP, April 25, 1988.

3. Ballin SD, Du Melle F, Davis AC, Myers ML. Petition to Classify R. J. Reynolds New Alternative Nicotine Delivery Product To Be Subject To the Jurisdiction of The Food and Drug Administration As a Drug. The Coalition on Smoking or Health, FDA Docket 88P-0155/CP, April, 1988.

4. Cooper RM, Levinstein MS, Reilly MT. Comments of R. J. Reynolds Tobacco Company. R. J. Reynolds Tobacco Company, FDA Docket 88P-0155/CP, August 23, 1988.

5. Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco. Winston-Salem, NC, R. J. Reynolds Tobacco Company, 1988.

6. "A Special Report to Smokers." Six page advertising insert from R. J. Reynolds Tobacco Company, Better Homes and Gardens (Regional edition circulated in St. Louis, MO), November 1988; 66(11):following page 192.

7. Yeaman A, George WB, Harrington ME, et al. Letter to Federal Trade Commission, December 17, 1970.

8. Office on Smoking and Health. The Health Consequences of Smoking: Nicotine Addiction. Public Health Service, U. S. Government Printing Office Publication Number DHHS (CDC) 88-8406, 1988.

9. Warner KE. Selling Smoke: Cigarette Advertising and Public Health. Washington, DC, American Public Health Association, October , 1986.

10. Federal Trade Commission. Report to Congress Pursuant to the Federal Cigarette Labeling and Advertising Act, 1986. Washington, DC, May 1988.

11. Warner KE. Cigarette advertising and media coverage of smoking and health. New Engl J Med 1985; 312:384-388.

12. Office on Smoking and Health. The Health Consequences of Smoking: The Changing Cigarette. Public Health Service, U. S. Government Printing Office Publication Number DHHS (PHS) 81-50156, 1981.

13. Gori GB, Bock FG. Banbury Report 3: A Safe Cigarette? Cold Spring Harbor, NY, Cold Spring Harbor Laboratory, 1980.

14. Package insert for Nicorette (R), Cincinnati, Ohio, Lakeside Pharmaceuticals, 1988.

15. Michels DL. FDA regulatory letter on Favor to J. Philip Ray. Bethesda, MD, February 9, 1987.

16. Young FE. FDA letter to Congressman Henry A. Waxman. Rockville, MD, September 29, 1987.

17. Leventhal H, Glynn K, Fleming R. Is the smoking decision an informed choice? JAMA 1987; 257:3373-3376.

18. Bureau of the Census. Statistical Abstract of the United States, 1987. Washington, DC, U. S. Department of Commerce, December 1986.

19. Johnston LD, O'Malley PM, Bachman JG. National Trends in Drug Use and Related Factors Among American High School Students and Young Adults, 1975-1986. Rockville, MD, National Institute on Drug Abuse, 1987.

20. Fisher WS, Boyle CM, Edwards J, et al. Drug and Alcohol Use Among New Jersey High School Students. Trenton, New Jersey Department of Law and Public Safety, 1987.

21. Coggins CRE, Mosberg AT, Burger GT, et al. Ninety-day inhalation study in rats, comparing smoke from cigarettes which burned or only heated tobacco: 3. blood composition. (abstract) Dallas, Texas, Society of Toxicology, February 1988.

22. Mosberg AT, Coggins CRE, Burger GT, et al. Ninety-day inhalation study in rats, comparing smoke from cigarettes which burned or noly heated tobacco: 4. minute ventilation. (abstract) Dallas, Texas, Society of Toxicology, February 1988.

23. Warner KE. Smoking and health implications of a change in the federal cigarette excise tax. JAMA 1986; 255:1028-1032.

24. Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. J Consult Clin Psychol 1983; 51:390-395.

25. Burry RD. The new cigarette: what it means and who will produce it. Tobacco International September 2, 1988, pp 10-18.

Table

Estimated Smoking Prevalence in 1964
Among Men Who Were Smokers in 1985

1985 Age Group	1985 Smoking Prevalence (%)	Number Smoking (millions) 1985	1964
15-19	30	2.8	0
20-24	31.0	3.3	0
25-34	38.2	8.0	0.8
35-44	37.6	5.9	4.4
45-64	33.4	7.2	7.2
65 +	19.6	2.3	2.3
Total		29.5	14.7

Notes.

Smoking prevalence for 15-19 year olds estimated from Ref. 19 and 20. About 20% of high school seniors smoke every day, and another 20% smoke some of the time but less than daily. The prevalence of daily smoking rises abruptly with graduation from high school.

Smoking prevalence for other ages from Ref. 8.

Population figures are based on 1985 Bureau of Census estimates (18).

In 1964, those aged 25-34 in 1985 were 4 to 13 years old. A rate which is 10% of that observed in 1985 is assigned this group for 1964. Similarly, the 35-44 year old group for 1985 was 14-23 years old in 1964. Three-fourths of this group is assumed to have been smoking at that time.

Migration is not considered.

Figure 1. Market Share
Filter Cigarettes &
Cigarettes Delivering 15 mg Tar or Less

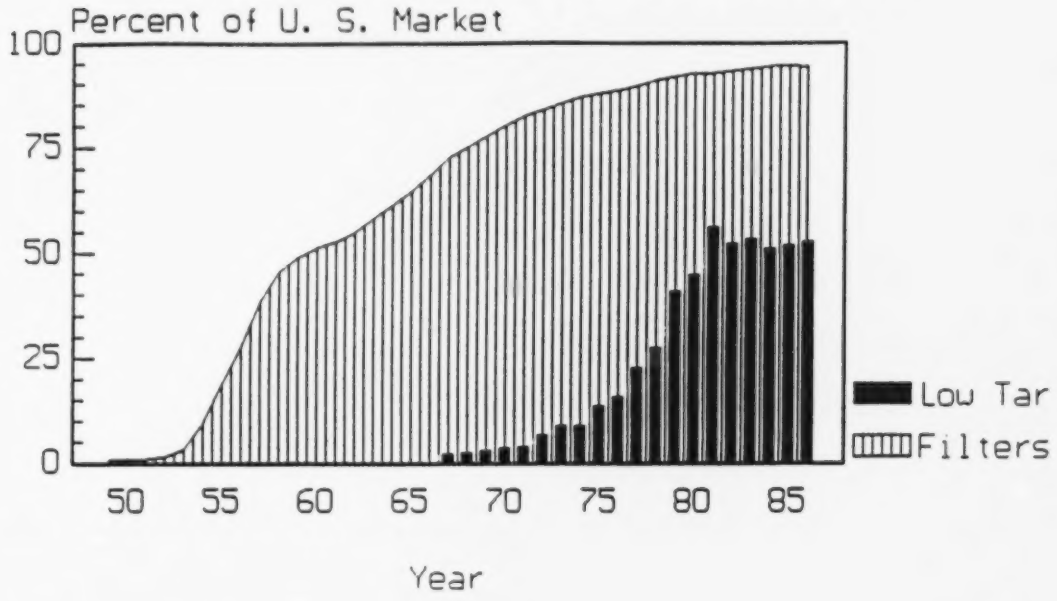

Figure 2. Plasma Nicotine
Rats Exposed to Cigarette Smoke
or to Aerosol from Nicotine Inhaler